

1 WE CLAIM:

- 1 1. A head stack assembly (HSA) for use in a disk drive comprising a disk, wherein a merge
2 tool is used to merge the HSA with the disk during manufacturing of the disk drive, the
3 HSA comprising:
 - 4 (a) at least one actuator arm;
 - 5 (b) a suspension connected to a distal end of the actuator arm;
 - 6 (c) a head connected to a distal end of the suspension, wherein the suspension for biasing
7 the head toward the disk; and
 - 8 (d) a multi-level shipping comb attached to the actuator arm, the multi-level shipping
9 comb comprising at least one finger for maintaining the suspension in a near optimal
10 vertical position, wherein:
11 the finger comprises a first surface and a second surface, wherein the second surface
12 is raised relative to the first surface;
13 during shipping of the HSA, the first surface of the finger contacts the suspension to
14 protect against overstressing the suspension; and
15 during manufacture of the disk drive, the shipping comb is actuated so that the second
16 surface contacts the suspension thereby bending the suspension in a vertical
17 direction to facilitate the insertion of the merge tool.
- 1 2. The HSA as recited in claim 1, wherein:
 - 2 (a) the actuator arm comprises an aperture; and
 - 3 (b) the shipping comb comprises a pin and a latching member, wherein the shipping
4 comb is attached to the actuator arm by:
5 inserting the pin through the aperture of the actuator arm; and
6 rotating the shipping comb in a first direction until the latching member latches onto
7 the side of the actuator arm and the first surface of the finger contacts the
8 suspension.

- 1 3. The HSA as recited in claim 2, wherein the shipping comb is actuated by rotating the
- 2 shipping comb so that the second surface contacts the suspension thereby bending the
- 3 suspension in a vertical direction to facilitate the insertion of the merge tool.
- 1 4. The HSA as recited in claim 3, wherein the shipping comb is actuated by rotating the
- 2 shipping comb in the first direction.
- 1 5. The HSA as recited in claim 3, wherein the shipping comb is actuated by rotating the
- 2 shipping comb in a second direction opposite the first direction.
- 1 6. The HSA as recited in claim 1, wherein:
 - 2 (a) the second surface comprises a beveled surface with respect to the first surface; and
 - 3 (b) the suspension slides over the beveled surface when the shipping comb is actuated.
- 1 7. The HSA as recited in claim 2, wherein after the merge tool is inserted, the shipping
- 2 comb is detached from the actuator arm by rotating the shipping comb in a second
- 3 direction opposite the first direction.
- 1 8. The HSA as recited in claim 1, wherein after the merge tool is inserted, the shipping
- 2 comb is detached from the actuator arm causing the suspension to retract vertically and
- 3 engage the merge tool.
- 1 9. The HSA as recited in claim 1, wherein the suspension comprises a coating for contacting
- 2 the first and second surfaces of the finger to reduce friction between the finger and the
- 3 suspension.
- 1 10. The HSA as recited in claim 1, wherein:
 - 2 (a) the finger of the shipping comb comprises an arcuate shape such that the first and
 - 3 second surfaces comprise an arcuate shape; and
 - 4 (b) the second surface comprises a radius larger than a radius of the first surface.

- 1 11. A method of manufacturing a disk drive comprising a base casting, a disk, and a head
- 2 stack assembly (HSA), the HSA comprising at least one actuator arm, a suspension
- 3 connected to a distal end of the actuator arm, a head connected to a distal end of the
- 4 suspension, wherein the suspension for biasing the head toward the disk, and a shipping
- 5 comb attached to the actuator arm for maintaining the suspension in a near optimal
- 6 vertical position, the method comprising the steps of:
 - 7 (a) inserting the HSA into the base casting;
 - 8 (b) actuating the shipping comb to bend the suspension in a vertical direction to facilitate
 - 9 the insertion of a merge tool comprising a finger for engaging the suspension;
 - 10 (c) inserting the merge tool such that the finger of the merge tool moves into position
 - 11 without scraping against the suspension;
 - 12 (d) detaching the shipping comb from the actuator arm wherein the suspension retracts
 - 13 vertically and engages the finger of the merge tool; and
 - 14 (e) actuating the merge tool to merge the HSA with the disk.
- 1 12. The method as recited in claim 11, wherein the shipping comb is actuated by rotating the
- 2 shipping comb to bend the suspension in a vertical direction to facilitate the insertion of
- 3 the merge tool.
- 1 13. The method as recited in claim 11, wherein:
 - 2 (a) the shipping comb comprises a beveled surface; and
 - 3 (b) the suspension slides over the beveled surface when the shipping comb is actuated.
- 1 14. The method as recited in claim 11, wherein the shipping comb is detached from the
- 2 actuator arm by rotating the shipping comb.
- 1 15. The method as recited in claim 11, wherein the suspension comprises a coating for
- 2 reducing friction between the shipping comb and the suspension.